

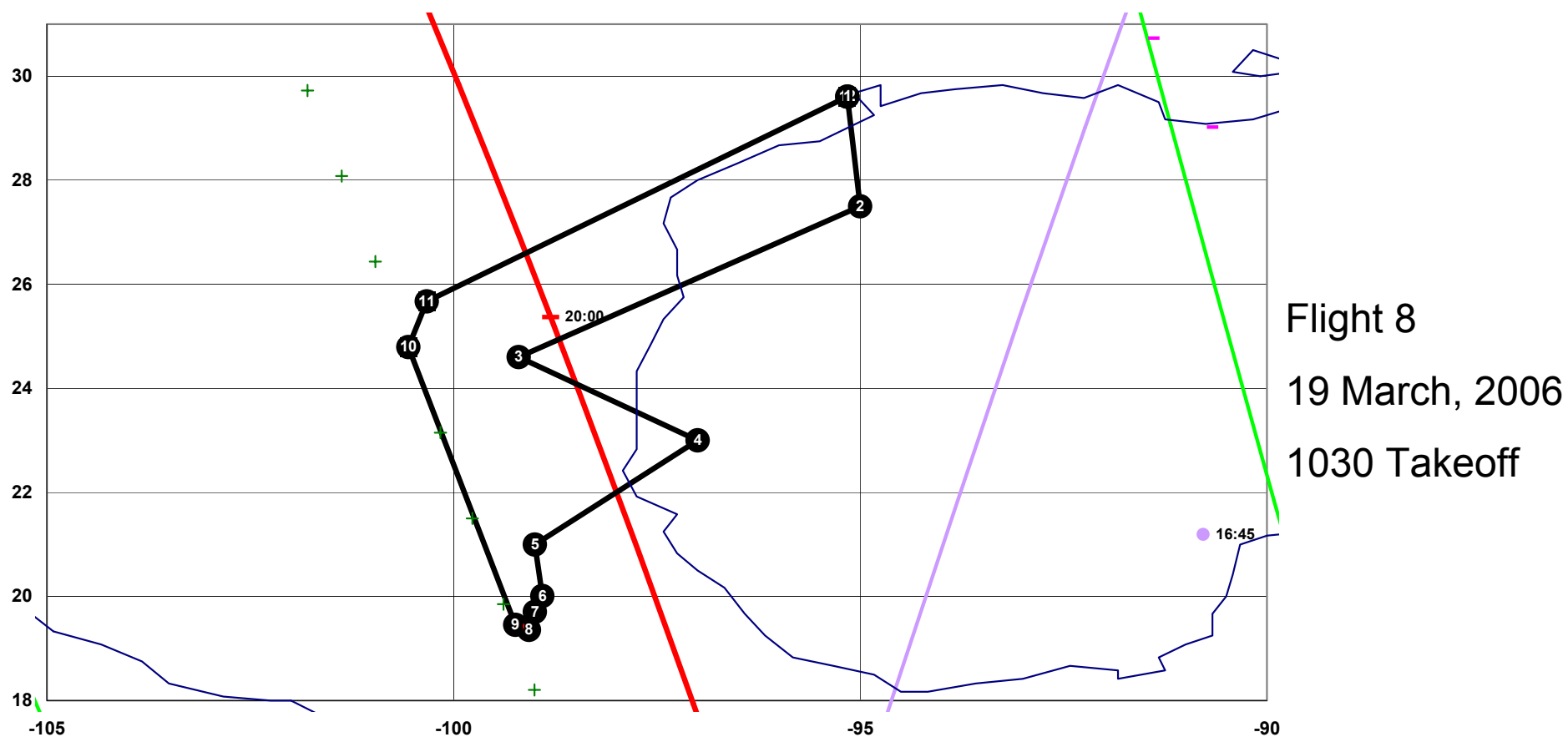
## **INTEX-B: Flight 8 (Science Flight; March 19, 2006; Sunday)**

This was the sixth INTEX-B science flight conducted from Houston. The objectives for this flight were inter-comparison with the NSF/NCAR C-130, coordinated spiral with the J-31, validation of Aura satellite instruments (TES and OMI), sampling of aged Mexico City pollution outflow, and the near source characterization of Mexico City and Monterrey pollution. Low level pollution over Mexico City and Monterrey was sampled using missed approaches by the DC-8. The nominal flight tracks and profiles are shown in the slides below but these were modified in-flight to take advantage of specific opportunities. Takeoff time was 1035 am (LT) and the flight duration was 6.4 hours.

All of the instruments aboard the DC-8 performed normally throughout the flight. The GT-LIF instrument is still not operating fully but did appear to collect some nitric oxide data. Surface analysis indicated a developing low pressure center over New Mexico and West Texas, along with broad high pressure over the eastern Great Lakes. A cold front (dry line) stretched southward from the low through New Mexico. Aloft, a low pressure trough was located north-south over the Rocky Mountains, while a ridge was located just east of Texas. The jet stream was oriented west of the flight area. This overall pattern produced mostly southerly or southwesterly winds over much of the flight area. The flow pattern was ideal for transporting pollution from Mexico City and biomass burning over Central America over the western Gulf. A broad layer of low to high clouds blanketed much of Texas and the extreme northern part of the flight area. Skies over Mexico City were mostly clear, except for scattered small cumulus over the mountains. Cloud bases corresponded to the top of the mixed layer. Clouds increased as the DC-8 returned to Texas.

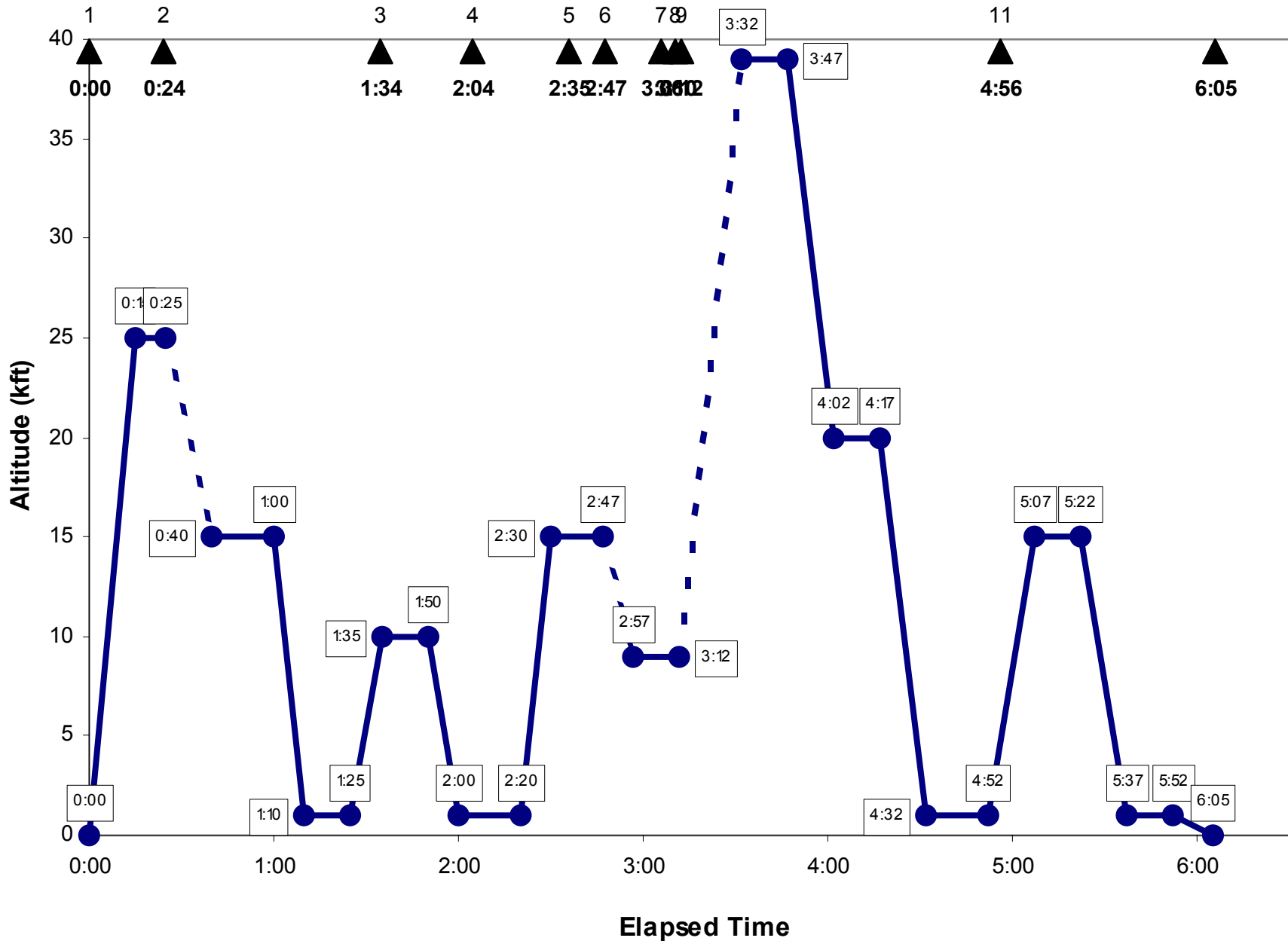
This was an excellent flight and we were able to meet all our objectives. The distribution of ozone and aerosol along the entire flight track, as observed by DIAL, is shown in slide 4. We initially climbed to 25 Kft and headed in the southerly direction looking for expected pollution plumes at lower levels as predicted by models (see slide 5). The skies became clearer as we headed south and we descended to 12.5 Kft to sample modest levels of pollution (CO <125 ppb; O<sub>3</sub> <55 ppb). Descent to 2 Kft AGL indicated that the outflow of pollution was weak but clearly identifiable (CO-150 ppb; O<sub>3</sub>-40 ppb; NO<sub>2</sub>-0.3 ppb, HCHO-2 ppb). We sampled this region between 2-10 Kft generally to find relatively clean air. After a run over the Gulf and the area over which the Mexico City plume was predicted to be present, the DC-8 joined the C-130 in formation for an inter-comparison. The inter-comparison run started at 2 Kft AGL and continued on to an 8.5 Kft leg. The concentrations at the lower leg were relatively uniform but varied substantially at the upper leg providing an excellent dynamic range for instrument checks. Shortly after separation with the C-130, a spiral descent was performed in conjunction with the J-31 just outside Mexico City. A missed approach into the Mexico City airport was conducted bringing the aircraft down to approximately 300ft off the deck. In general conditions were cleaner (CO-400 ppb; O<sub>3</sub>-75 ppb; NO<sub>2</sub>-3 ppb, HCHO-3 ppb) than previously sampled in part due to stronger surface winds (20 knts compared to 5 knts during previous runs) and due to the fact that it was a Sunday within a long weekend. Numerous fires were observed in the mountains surrounding the city and the strong winds produced very dusty conditions. A satellite validation spiral from surface to 37 Kft coincident with the TES track and within the OMI nadir position was performed just north of Mexico city. After this spiral we headed north along the TES track sampling air at several levels. At the end of the satellite track, the DC-8 did a missed approach into the Monterrey airport and a low pass over the city. Typical pollution levels over Monterrey City were comparable to Mexico City (CO-360 ppb; O<sub>3</sub>-75 ppb; NO<sub>2</sub>-5 ppb; HCHO-5 ppb). Returning for Houston, a few more flight levels were investigated in cloudy skies before landing.

ICATS archived data files for INTEX-B are available at: <http://www.nasa.gov/centers/dryden/research/AirSci/DC-8/ICATS/FY06/INTEX-B/index.html>



MLS	MLS timing	HIRDLS	HIRDLS timing
TES	TES timing	TES-Special	TES-Special timing
OMI-East Edge	OMI-West Edge	AIRS swath	MOPITT timing
MOPITT swath	DC-8 Flight Path		Mexico City

Point	1	2	3	4	5	6 (T2)	7 (T1)	8 (T0)	9 (TES)	10	11	12
Latitude	29.60733	27.5	24.6	23	21	20.01018	19.70307	19.35898	19.4538	24.793	25.67	29.60733
Longitude	-95.1588	-95	-99.2	-97	-99	-98.9088	-98.9986	-99.0735	-99.2399	-100.557	-100.33	-95.1588
Cum. Flt. Time	0:00	0:24	1:34	2:04	2:35	2:47	3:06	3:10	3:12	4:45	4:56	6:05
Leg Flt. Time		0:24	0:55	0:29	0:31	0:11	0:03	0:04	0:02	1:03	0:10	1:09
Local Time	10:30	10:54	12:04	12:34	13:05	13:17	13:36	13:40	13:42	15:15	15:26	16:35
UTC	16:30	16:54	18:04	18:34	19:05	19:17	19:36	19:40	19:42	21:15	21:26	22:35
Spiral		0:15				0:15			0:30			



Note: In-Progress profiling is solid; Spirals are dotted; Way points annotated with triangles ( ? ).



# Mexico City Plume 4 / C-130 / TES & OMI Flight 8

19 Mar 06

## Aerosol Scattering Ratio (1064 nm)

0.01 0.1 1 5 10 50



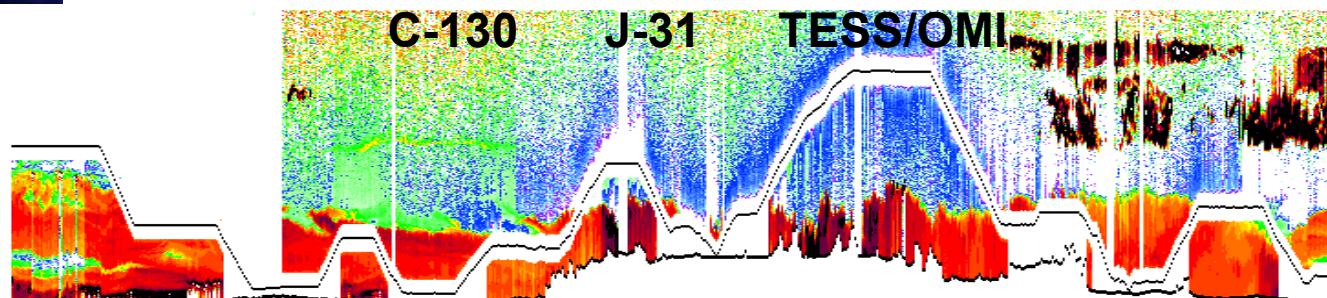
18:00 19:00 20:00 21:00 22:00

UT

A B C MC DM E

Altitude, km ASL

14  
12  
10  
8  
6  
4  
2  
0



16  
14  
12  
10  
8  
6  
4  
2  
0

## Ozone (ppbv)

0 20 40 60 80 100

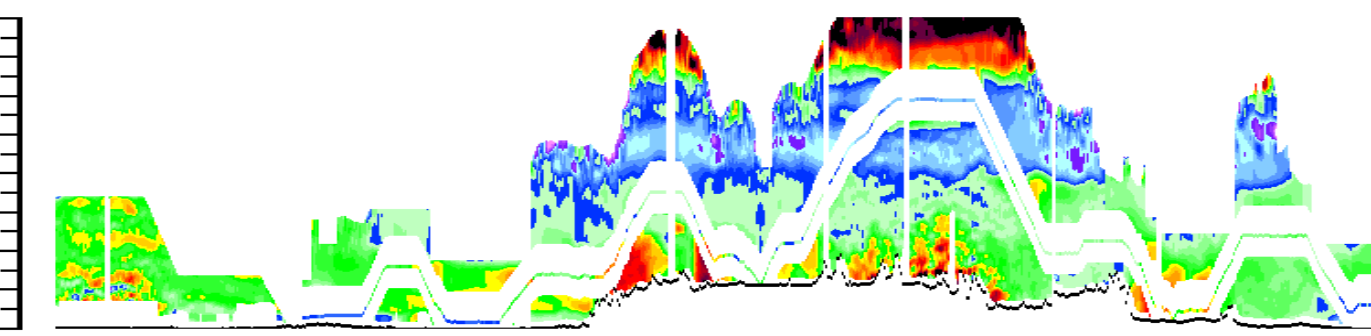


17:00 18:00 19:00 20:00 21:00 22:00

UT

Altitude, km ASL

16  
14  
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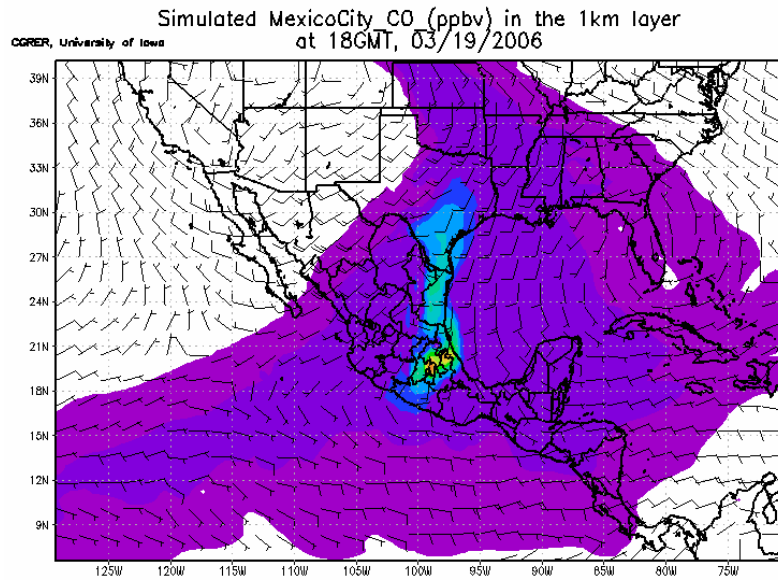
27.77 24.87 21.58 19.60 23.03 26.92

N Lat

-95.03 -98.58 -98.15 -98.97 -100.10 -99.53

E Lon

## STEM- 1 km



## STEM- 3km

